

### ABSTRACT OF THE DISCLOSURE

A precoded orthogonal frequency division multiplexer (OFDM) system that improves the performance of OFDM systems for spectral null channels, and size  $K \times 1$  vector OFDM systems that reduce the cyclic prefix length by  $K$  times compared to conventional OFDM systems. The precoding scheme comprises inserting one or more zeros between each of the two sets of  $K$  consecutive information symbols, although it can be generalized to a general form. This precoding scheme removes the spectral nulls of an ISI channel without knowing the ISI channel. When no zero is inserted between each of the two sets of  $K$  consecutive information symbols and only  $K$  consecutive symbols are blocked together, vector OFDM systems are obtained. The bit error rate performance of the vector OFDM systems of the present invention is much improved over conventional OFDM systems.